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Social Network Analysis and Soldier Resilience

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14. ABSTRACT

As studies are conducted in search of a metric to measure posttraumatic stress disorder (PTSD) and identify Soldiers who are at risk, attempts are being made to discover a measure that can provide insight into the resilience of a unit and seek to improve a unit's resilience. Using social network analysis (SNA), one may determine the cohesion of a unit through a physical representation of its social network and use this data to learn more about the effect of the unit's arrangement and friendships to improve resilience. In the civilian realm, several studies suggest a relationship between social networks and a person?s psychological fitness. This paper aims to expand upon this research within a military context to improve the psychological fitness of Soldiers. The first part of the paper is a review of the effects of combat stress on a Soldier, specifically PTSD and posttraumatic growth (PTG), and the second is a review of the current literature available on the SNA in relation to combat stress. Finally, a proposal for future research is made as to how to use SNA to predict the effects of combat stress on individual Soldiers and their units.

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ABSTRACT

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Introduction

The cost and benefits of combat-related stress on a Soldier vary greatly and may have negative or positive outcomes. The first half of the review will focus on posttraumatic stress disorder (PTSD), which historically has been the focus of research on the effects of combat stress. The discussion of PTSD is organized into five sections to include: its history, its definition, causes, risk factors, and treatments. Recently, an emerging body of literature is focusing on the positive outcomes of combat, specifically posttraumatic growth (PTG). This portion of the review is organized into three sections to include: the history and definition of PTG, benefits of PTG, and possible methods of increasing PTG.

History of PTSD

PTSD first began to enter into the psychology realm during the American Civil War. During this time several Soldiers began to report feeling physical and mental problems, but after inspection they were found to have no physical damage. One of the first medical studies of the problem was conducted by Dr. Jacob Mendez Da Costa immediately following the Civil War. Many of the Soldiers were complaining of symptoms consisting of fatigue, palpitations, chest pain, and several other problems that could not be explained. Terms such as “irritable heart” or “Soldier’s heart” were developed to describe the condition. Dr. Da Costa attributed the symptoms to several different causes, some of which included infectious diseases (Mandel, 2007).

Little research was done between the American Civil War and World War I, but a condition that showed symptoms similar to the ones described by Dr. Da Costa’s brought resurgence in interest on the topic. Soldiers were being sent back from the front lines with what was now being called “shell shock.” Many early attempts to find a treatment for the condition

resulted in little to no help. Attempts to find the causes of these cases were also fruitless. Initially, doctors believed that the symptoms may be the result of damage to the brain from the shockwave of exploding artillery shells near the front. However, in 1916 studies found that the symptoms were psychological in nature, not physical (Mandel, 2007). At first, the Soldiers were sent from the front lines back to England or France to be treated, but often they found that these Soldiers would become "psychiatric cripples" (FM 22-51: Leaders' Manual for Combat Stress Control, 1994). Eventually armies began to treat Soldiers immediately and near the front. This was found to have a greater effect and many of the Soldiers were able to return to the lines (FM 22-51, 1994).

During the inter-war period between World War I and World War II, much of what was learned about these conditions was forgotten. By the time World War II had started, the US military had developed the idea that only weak men could experience "shell shock" or what it is now called "battle fatigue". They believed that "normal" Soldiers would not be affected by the stresses of battle and it was not until later in the war that the military, after relearning what was forgotten, started to effectively treat Soldiers suffering from combat stress. This would start a cycle that would continue to repeat throughout the American wars of the 20th century (Mandel, 2007).

Eventually, throughout the late 20th century, more Soldiers began to come forward claiming to have psychological problems resulting from combat stress. These Soldiers had symptoms very similar to "Soldier's heart," "shell shock," and "battle fatigue." Eventually psychologists began to realize that these conditions were all one and the same and the term PTSD became nearly synonymous with US military actions since the Vietnam War. Now, the

PTSD is a recognized condition that has been officially added to the American Psychological Association (APA) Diagnostic Manual of Mental Disorders (DSM) (Yehuda, 2002).

Definition

In order to be diagnosed with PTSD, a person must meet four criteria as established by the American Psychological Association (APA). The first criterion is that a person must experience a traumatic event (Diagnostic and Statistical Manual of Mental Disorders, 1994). A traumatic event is generally something that "provokes fear, helplessness, or horror in response to the threat of death or injury" (Yehuda, 2002). This is could be an event ranging from combat, natural disasters, or car wrecks, to watching an event such as the 9/11 attacks or even the natural death of a loved one. Obviously, this could be very subjective. One person may perceive an event as enjoyable while another may be frightened to the point of sickness (Matthews, 2008).

The second criterion is that a person must experience the event persistently over the course of a month (Diagnostic and Statistical Manual of Mental Disorders, 1994). There are many possible ways to do this. A person may have recurring memories or flashbacks, dreams, nightmares, night terrors, or intense psychological or physical reactions to a reminder of the traumatic event (Adler, Vaitkus, & Martin, 2002).

Third, a person with PTSD will avoid reminders of the traumatic event. This is represented by the existence of at least three of the following symptoms. Individuals may avoid persons, places, or things that remind them about the event or that person may not talk about the event at all. A person may be unable to recall certain aspects of the event, experience a general lack of interest, or feel detached from the world and his emotions. Finally, the person may feel as though the future no longer matters and may feel as though there is no need to plan for the future anymore (Diagnostic and Statistical Manual of Mental Disorders, 1994).

The final criterion is that the person must be in a state of hyper-arousal. This is determined by the presence of at least two of the following symptoms: difficulty sleeping or concentrating, increased vigilance and concern for safety, or exaggerated startle reactions (DSM-IV, 1994). Only when a person meets all of these criteria and experiences their effects for at least a month, with detrimental effects on a person's ability to function, can someone be diagnosed with PTSD (DSM-IV, 1994). One last important note to make is that although PTSD does interfere with many aspects of a person's life, there is a large amount of empirical evidence that states that it will not affect a person's attention, memory, or ability to learn or take tests (Brenner, et al., 2010) (Neylan, et al., 2004).

Causes

The causes of PTSD are numerous but they all have one common thread. They are all related to a traumatic event that occurred in which a person feared serious injury or death for a period of time (Common Reactions and Consequences of Combat, 2009). It appears as though most events occur over a relatively short amount of time. This could be anything from a few minutes, such as car crashes, bombings, or shootings, or up to several days, such as extended combat operations or natural disasters. However, some events can be on the order of years in length. These cases are rarer, but do exist in situations such as for prisoners of war or for Soldiers that are deployed to a war zone who may constantly fear for their life (Yehuda, 2002).

Risk Factors

There are many different possible risk factors that could be used to predict a Soldier's susceptibility to PTSD. A Soldier's age (Garb & Cigrang, 2008), race (Ruef & Schlenger, 2000), rank, exposure to death (Adler, Vaitkus, & Martin, 2002), location to which they are deployed (Hoge, Castro, Messer, McGurk, Cotting, & Koffman, 2004), heart rate, skin conductance

(Kibler & Lyons, 2004), marital status (Newby, McCarroll, Ursano, Fan, Shigemura, & Tucker-Harris, 2005), handling of human remains (McCarroll, Ursano, & Fullerton, 1995), or active duty versus National Guard/Reserve status (Vogt, Samper, King, & Martin, 2008) are all significantly correlated with the risk of PTSD. However, just because a Soldier is at risk does not mean that one will not go on to live a normal life or not be an excellent Soldier, so care should be exhibited if using these factors to psychologically screen persons.

Treatment

There are currently many options for treatments for Soldiers and veterans with PTSD, although some of these methods lack empirical evidence and require further scientific investigation. Due to the increased number of deployments by military units over the last 9 years, psychologists have seen an increase in numbers of patients with PTSD. In a study of 10 veterans ranging from ages 23 to 56, private to officer, and combat arms to combat support, researchers found several things were common to each interview. The ground which connected all of the Soldiers was their *job.* They also all used similar themes to describe their experiences. These were *being there, awareness of others,* and *a different world* (Shaw & Hector, 2010). Using these, a psychologist can have a basic understanding of all Soldiers before they even enter their office.

One current treatment available is cognitive-behavioral treatment (CBT). This is a leading psychological treatment that consists of several different stages. There is empirical evidence that CBT is effective at treating several different disorders in the civilian world; however, little data exists that supports it as an effective treatment of PTSD in the military world. Eye Movement Desensitization and Reprocessing (EMDR), Image Rehearsal Therapy (IRT) (Creamer & Forbes, 2004), social support (Hoyt, Pasupathi, Smith, Yeater, Kay, & Tooley,

2010), and group therapy such as the “rap groups” from the Vietnam War are all examples of other treatments that lack empirical evidence but all show promise (Creamer & Forbes, 2004).

Posttraumatic Growth History and Definition

Posttraumatic Growth (PTG) has its roots in humanistic psychology and, more recently, the positive psychology movement. Until the 1990’s, the majority of research into human psychology was focused on “negative psychology” or disorders such as depression, anxiety, or PTSD. The positive psychology movement pushed towards “building a *science* of human strengths, virtues, and excellence” (Matthews, 2008). Instead of focusing on curing problems with a person, we should to prevent them from ever having them. It’s like a flu shot for the brain. In essence, psychologists should be attempting to build a person’s resilience to stress and prevent them from ever getting PTSD in the first place.

From these beliefs, psychologists looked to find the good in traumatic events. In the military they found that many Soldiers often found benefits from their deployments and combat and that most of the time, the Soldiers that perceived these benefits had lower rates of PTSD (Aldwin, Levenson, & Spiro, 1994). Researchers also found that the very factors that could lead to PTSD also led to greater amounts of PTG (Joseph & Linley, 2004). There have been several claims that these claims of PTG have been biased; however, there is a large body of empirical evidence to support the claims (Calhoun & Tedeschi, 2004). Several studies have even been conducted to test for bias in PTG research and have concluded that the current methods are probably underestimating the actual rates of PTG (Smith & Cook, 2004).

Benefits

There are many possible benefits to experiencing a traumatic event. The benefits include, but are not limited to, increased appreciation for life, better coping skills, and a greater understanding of one's self (Cadell, Regehr, & Hemsworth, 2003). These are but a few of the increases in personal strengths and character that people have reported after experiencing a traumatic event. There are even reports of increased resilience and hardiness which can lead to a better resistance to stress and future traumatic events (Matthews, 2008).

Methods of increasing PTG

Currently there is a growing library of literature that deals with the possibility of increasing PTG for a person. Joseph & Linley (2004) believe that the factors that can increase the intensity of PTSD from a traumatic event, threat, harm, and controllability, are also positively correlated with PTG. Therefore, there must be an attempt at limiting PTSD's other factors while increasing those that lead to PTG or else as much damage could be done as good. Cadell, Regehrm & Hemsworth (2003) offer that spirituality, social support, and good stressors all have a significant positive correlation with PTG. Increasing these factors could help to increase overall PTG following a traumatic event. There should be more research done in this area though, because according to Matthews (2008), spirituality can be used as a method of decreasing a Soldier's fear in battle which would decrease the threat of the situation and increase the Soldiers control over the situation. In turn, this would lead to a decrease in both PTSD and PTG.

Finally, the US Army is currently experimenting with a new program to decrease a Soldier's susceptibility to stress and increase their ability to experience PTG. The Master Resilience Trainer is currently being instituted Army wide (Reivich, Seligman, & McBride,

2011). It is a 10 day program that teaches non-commissioned officers (NCO's) methods of increasing resilience in their Soldiers. The hypothesis is that this program will decrease the rate of PTSD among Soldiers while increasing the rate of posttraumatic growth.

Social Network Analysis

In addition to the Master Resilience Trainer Program, social network analysis (SNA), which refers to the idea of studying social networks in order to obtain insight into human behavior (McGloin and Kirk, 2010), may be another method to increase PTG. SNA is a method that provides empirical data and information about a subjective topic. Humans are, by nature, social beings. Where some members of the animal kingdom operate fine with little to no social interaction with others, humans are not capable of living in such a manner. Person-to-person interaction is vital to the continuation of the species, and being that humans do not normally have multiple mates for the intent of reproduction; the social network around a child has a huge impact on how it is developed (Kilduff and Krackhardt, 2008). This does not limit the need for social interaction to childhood. People depend on social networks and interaction for economic purposes. For instance finding a job or running a successful business organization is very dependent on the social links between people throughout a company (Kilduff and Krackhardt, 2008). But even more important than the business world's dependence on interpersonal relationships, is the impact these relationships have on a person's psychological well-being, especially when that person works in a profession such as the Army, where relationships and psychological welfare have a direct impact on Soldiers' lives and the lives of the people around them. SNA is a valuable tool that allows for understanding a network through description, visualization, and statistical modeling (Van Duijn & Vermunt, 2006).

Perhaps the most important aspect of a social network is the perceived network, as it is seen by the people in it. This perception can affect the way individual members of these networks work together as well as their usefulness in an organization (Kilduff and Krackhardt, 2008). While command climate surveys can provide some insight about unit cohesiveness, information provided by Soldiers regarding friends in one's unit and from whom they seek advice, may likely provide a better representation of the social success of a unit. It is common for different people to have different perceptions of the same situation; cognitively speaking it is very unlikely for an entire organization to all share the same views and opinions about the people they work with (Gibson, Cooper and Conger, 2009). While Private John Smith may believe himself to be a popular hub, a person in the network who is linked with many others, in reality he could be on the outskirts of the network as perceived by the rest of his platoon. While this in itself is an interesting concept, what is more important is the impact that this perception has on the actions taken by the members based on the value they place on their role in the network (Kilduff and Krackhardt, 2008). This can have a major effect on individuals' interactions with the rest of the network. For example, if Private Smith believes that he is on the outskirts of the social network, he is less likely to volunteer personal information such as the fact that he has been contemplating suicide, for fear of further ridicule and lowering his popularity even further. It becomes increasingly important to ensure that the social network of an infantry unit is strong to ensure everyone can be depended upon in a dangerous combat situation. This leads into the psychological aspect of social networks. SNA provides the means to view these networks from an analytical point of view so that we can better understand the dynamics of them (McGloin and Kirk, 2010). The effect of a person's social network can have a large psychological effect without even realizing it. This may be manifested in a number of ways. With regard to the

Comprehensive Soldier Fitness (CSF) program, these psychological responses are directly related to areas deemed important enough to be measured by the Global Assessment Tool (GAT). Specifically, these are friendship/loneliness, social factors (trust, engagement with others), depression, and family fitness. All of these are important to the pursuit of psychological fitness, yet very difficult to measure directly. Using SNA, it is possible to account for each of these, and measure the success of CSF in improving these measures. If we look at one factor in particular, we can see why it is increasingly important to be able to improve and measure these factors. Loneliness and a Soldier's perception of loneliness can be detrimental to a unit's success. John Cacioppo, in his book *Loneliness*, talks of chronic loneliness, which is the result of a person being in social isolation (Cacioppo, 2008). Social isolation refers to a person experiencing few positive social interactions (Gambrill, 1996) and having a weak personal social network does not allow for many positive interactions. Basically the outliers in a social network, the people with the fewest connections to other people in the unit, are more inclined to develop a deep sense of loneliness. This feeling of loneliness can, and likely will, result in changes in behavior and thinking (Cacioppo, 2008). This has the potential to be very destructive to a unit, especially a unit in combat that inevitably depends on this Soldier for their role in the unit. What is worse is that this feeling of loneliness has the potential to spread through the unit and impact performance. According to Cacioppo (2009), loneliness spreads quicker and more easily than the perception of having strong social connections. This presents another use for social network analysis.

SNA provides formal definitions for social and behavior theories based in social networking (Wasserman & Faust, 1994). "One cannot use multiple regression, *t*-test… and so forth, to study social network data or to test theories" (Wasserman & Faust, 1994). Without using

social analysis it becomes difficult to quantify the theories that are presented in these studies of social behavior. SNA becomes necessary in order to accurately represent the social structure of a unit in a way that it can be measured and conclusions about the social progress of a unit can be determined. Social network data is easily collected by means of questionnaires which ask the members of a unit who they are socially connected with at a given time. This information can then be placed into a computer program which will provide a visual representation of the network, an example is represented below in Figure 1. From this visual, a social network analyzer can gather data on how strong the network for a unit is and at what level the network is strongest (e.g., company or platoon). By using comparative modeling of the data collected or information known about a unit, inferences can be made about the effects of the network on different aspects of a Soldier's overall fitness as defined by the Comprehensive Soldier Fitness program.

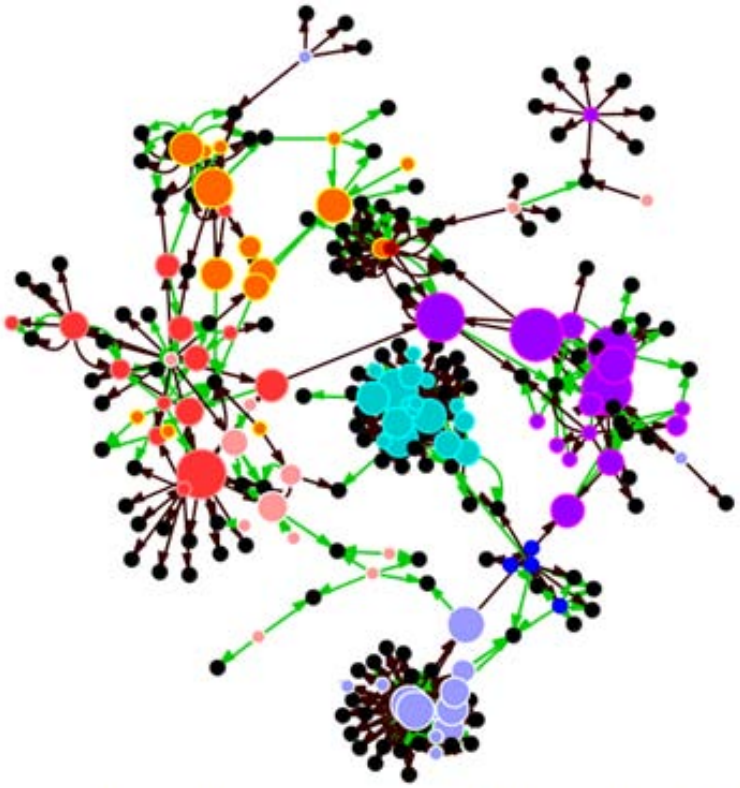

Figure 1. Visual representation of the social network from two companies stationed at Fort Drum NY.

While SNA has not been specifically used to measure PTSD susceptibility or improvements in PTG, it has been used in similar situations looking at the psychological implications of a social network. One such use is in social conformity. Social conformity is one example of the psychological impact of a person's perceived network, with those on the periphery of the network being most likely to conform in an attempt to fit in with the group (Gilbert, Fiske, & Lindzey, 1998). This trend of social conformity goes for any social network, not just strongly established networks. In the classic Asch experiment on social conformity, participants were told that they and several other people are going to be doing a segment length matching study (Vlaander & Van Rooijen, 1985). Unbeknownst to the subject, the other participants were all actors instructed to all agree on an incorrect answer. Although he did not

believe their answer to be true the subject conformed to the answer determined by the rest of the group. Major Ian McCulloh, of the United States Military Academy, replicated this study in a military setting using a promotion board as the setting and common military knowledge with well known answers as the questions he asked (McCulloh, 2010). He found the same result as in the Asch experiment. When a person is singled out as being on the outskirts of the network, even when in a group of people they did not know before the actual study, the desire to fit into the group caused conformity. SNA may help us understand the social situations of Soldiers and possibly save them from doing something inadvertently wrong.

As we begin to better understand PTSD and the effects of it on the Soldiers we send into harm's way to fight for our nation, it is our responsibility to do whatever we can to mitigate the risk each Soldier has of developing PTSD or other anxiety disorders as a result of combat. Research has been done to show the effect of social networks on some aspect of psychology such as depression and suicidal thoughts, and there is strong potential suggesting this would be effective in better understanding who is at risk for PTSD or other anxiety disorders (Achat, 1998). Major Joseph Geraci of the Behavioral Sciences and Leadership Department at West Point is currently studying different factors that influence a Soldier's resilience and susceptibility to PTSD (Geraci, 2010). The study is being conducted with an Army unit in the North East. The Soldiers in each company filled out a survey which questioned them on many aspects of their lives including which people they were socially connected to. They also filled out the Posttraumatic Stress Disorder Checklist (PCL), a checklist designed to determine whether a Soldier has PTSD (Bliese et al., 2008). Figure 1 is the social networks from two companies in that study. From this study we are learning what factors have a significant impact on Soldiers and their resilience, PTSD susceptibility, and PTG potential. These findings will provide a better

understanding of the direct relationship between a Soldier's social network and PTSD susceptibility. Additionally, this study will allow for an examination of the social network of a unit and its overall performance, both in garrison and combat.

Conclusion

When it comes to the Army and what measures are used and developed for use, the issues of functionality and economic strain are among the first to surface. It is not beneficial for the Army to pay for and implement a system if it is extremely expensive and or not proven to be effective in another setting. Fortunately, neither of these is an issue when considering using social network analysis as a tool for the diagnosis of individual Soldier and unit mental fitness. Based upon the current research of Major Geraci, collecting the data does not appear to be extremely difficult, as he collected a battalions worth of data from a unit in theater over the course of a few days. Based on the work of Major McCulloh, coding the data and analyzing it in a social network analysis program can be done in a reasonable amount of time using a small team of people, such as Cadets. These low requirements for materials and manpower make this a very economically friendly option. It is likewise an effective option. As demonstrated throughout this paper, there is a relationship between the social network and mental fitness of individuals as well as units. Therefore, this suggest that there is some benefit to using this method as a diagnostic tool, or as a measure to assess how effective steps to improving the social network are, while not assuming a major fiscal risk.

Annotated References

Adler, A., Vaitkus, M., & Martin, J. (2002). Combat exposure and posttraumatic stress symptomatology among U.S. Soldeirs deployed to the Gulf War. *Military Psychology , 8* (1), 1-14.

This is a study researching the implications of combat exposure on veterans of Operation Desert Shield/Storm. It provided information on correlations between rank, exposure to death, and multiple other independent variables to rates of PTSD.

Aldwin, C., Levenson, M., & Spiro, A. (1994). Vulnerability and resilience to combat exposure: can stress have lifelong effects? *Psychology and Aging , 9,* 34-44.

It was determined that a correlation existed between Soldiers that perceived beneficial effects from their time in the military and rates of PTSD. Soldiers with a higher perception of benefits generally were found to be less likely to experience high levels of PTSD than Soldiers that did not.

Bliese, P. D., Wright, K. M., Adler, A. B., Cabrera, O., Castro, C. A., & Hoge, C. W. (2008). Validating the primary care posttraumatic stress disorder screen and the posttraumatic stress disorder checklist with Soldiers returning from combat. *Journal of Consulting and Clinical Psychology, 76*(2), 272-281.

A study was conducted to verify whether the Primary care Posttraumatic Stress Disorder Screen and the Posttraumatic Stress Disorder Checklist were successful measures for determining who has PTSD.

Brenner, L., Terrio, H., Gutierrez, P., Homaifar, B., Staves, P., Harwood, J., et al. (2010). Neuropsychological test performance in Soldiers with blast-related mild TBI. *Neuropsychology , 24*(2), 160-167.

In this study, it was determined that Soldiers with mTBI and PTSD are not significantly different from Soldiers without mTBI and PTSD in performance on nueropsychological tests.

Cacioppo, J., & Patrick, W. (2008). *Loneliness: Human Nature and the Need for Social Connection*. New York: W.W. Norton & Company. Retrieved April 14, 2010.

John Cacioppo is one of the world leaders in the study of loneliness, in this book he explains what loneliness means, why people need social interaction, and how to help the lonely. He also explains chronic loneliness and the psychological aspects of loneliness.

Cadell, S., Regehr, C., & Hemsworth, D. (2003). Factors contributing to posttraumatic growth: A proposed structural equation model. *American Journal of Orthopsychiatry , 73*(3), 279-287.

The study described three variables that had possible connections to PTG: spirituality, social support, and stressors. It was found that a positive significant correlation existed between all three factors and increases in PTG.

Calhoun, L., & Tedeschi, R. (2004). Posttraumatic growth: Conceptual foundations and empirical evidence. *Psychological Inquiry , 15*(1), 1-18.

A good general overview of PTG, it contains information on its foundations, empirical evidence supporting PTG and is an overall good source of information for those who are new to the concept of PTG.

Common Reactions and Consequences of Combat. (2009, November 10). Retrieved April 29, 2010, from United States Department of Veteran Affairs: http://www.visn21.va.gov/oif_faqs_common.asp

An informational webpage created by the US Department of Veteran Affairs which contains answers to commonly asked questions about PTSD. All of the information that I recognize appears to be correct and the webpage describes PTSD in terms that are easily understood by those who do not have a background in behavioral sciences.

Creamer, M. & Forbes, D. (2004). Treatment of posttraumatic stress disorder in military and veteran populations. *Psychotherapy: Theory, Research, Practice, Training , 41* (4), 388-398.

A general outline of multiple methods of treatment available and the empirical evidence, or lack thereof, backing those treatments. The article also makes recommendations for further research regarding these methods.

Diagnostic and Statistical Manual of Mental Disorders (4th Edition ed.). (1994). Washington D.C.: American Psychological Association.

A manual published by the APA which contains diagnostic criteria for most recognized mental disorders. It provided the criteria which is used to diagnose PTSD.

FM 22-51: Leaders' Manual for Combat Stress Control. (1994). Department of the Army.
The US Army's manual on combat stress. It provided historical background for combat stress.

Garb, H., & Cigrang, J. (2008). Psychological Screening: Predicting Resilience to Stress. In B. Lukey, & V. Tepe (Eds.), *Biobehavioral Resilience to Stress* (pp. 3-23). Boca Raton, FL: CRC Press.

An article which talks about the multiple screening methods that the military currently uses and discusses the usefulness of several factors that could be used to predict the level of risk for PTSD in a Soldier.

Geraci, J. (personal communication, 2010).

Gibson, C.B., Cooper, C., & Conger, J.A. (2009). Do you see what we see? The complex effects of perceptual distance between leaders and teams. *Journal of Applied Psychology, 94*(1), 62-76.

Gilbert, D.T. Fiske, S.T. & Lindzey, G. (Eds.). (1998). *The handbook of social psychology*. New York: Oxford University Press.

Hoge, C., Castro, C., Messer, S., McGurk, D., Cotting, D., & Koffman, R. (2004). Combat duty in Iraq and Afghanistan: Mental health problems, and barriers to Care. *The New England Journal of Medicine , 351*, 13-22.

In this study, they found that Soldiers deployed to Iraq experienced a higher number of cases of PTSD than those in Afghanistan. This makes sense considering the larger number of troops in Iraq and the more intense combat conditions in Iraq compared to Afghanistan at the time.

Hoyt, T., Pasupathi, M., Smith, B., Yeater, E., Kay, V., & Tooley, E. (2010). Disclosure of emotional events in groups at risk for posttraumatic stress disorder. *International Journal of Stress Management , 17*(1), 78-95.

A study conducted on two groups at risk of PTSD, Soldiers and civilian first responders, and a control group of college students. It supported the literature currently available by saying that social support and disclosure play important roles in mitigating PTSD.

Joseph, S., & Linley, A. (2004). Positive change following trauma and adversity: A review. *Journal of Traumatic Stress , 17*(1), 11-21.

A review of the literature supporting PTG, it contains a large amount of information on the subject. It establishes that some of the variables which can increase the chances of PTSD, such as threat, harm, and controllability, also increase the chances of PTG in a person.

Kibler, J., & Lyons, J. (2004). Perceived Coping Ability Mediates the Relationship Between PTSD Severity and Heart Rate Recovery in Veterans. *Journal of Traumatic Stress , 17* (No. 1), 23-29.

A study conducted on the physiological conditions of PTSD. The researches found that several factors such as heart rate, electromyographic, and skin conductance reactivity were all increased in people with PTSD.

Kilduff, M., & Krackhardt, D. (2008). *Interpersonal Networks in Organizations*. New York: Cambridge University Press.

Kilduff and Krackhardt explain the psychological reasoning behind people and their need to be socially accepted. They also talk about what can happen if one does not fit into a social network.

Mandel, L. R. (2007). Combat Fatigue: A Long-term Diagnosis. *The Grog Ration* , 1-4.

A historical overview of combat stress and PTSD since the American Civil War, it provided needed background information.

Matthews, M. D. (2008). Positive Psychology: Adaptation, Leadership, and Performance in Exceptional Circumstances. In P. Hancock, & J. Szalma, *Performance Under Stress* (pp. 163-180). Burlington, VT: Ashgate Publishing Company.

This chapter focuses on the differences of civilian and military leadership, positive psychology, and factors contributing to resilience and PTG.

McCarroll, J., Ursano, R., & Fullerton, C. (1995). Symptoms of PTSD following recovery of war dead: 13-15-month follow-up. *The American Journal of Psychiatry , 152* (No. 6), 939-941.

A study of Soldiers who handled human remains during the Persian Gulf War, the study found that these Soldiers, particularly those who handled US Soldier remains, were at a higher risk for PTSD symptoms than those who did not.

McCulloh, I., Torgerson, T., Lombardi, D., & Kiernan, L.B. (2010, April). Network effects on Asch conformity. Paper presented at the 6th UK Social Networks Conference, University of Manchester.

McGloin, J. & Kirk, D. (2010). An overview of social network analysis [Electronic version]. *Journal of Criminal Justice Education, 21*(2), 169-181. doi:10.1080/10511251003693694

The article gives an explanation of what social network analysis is and how it useful as a technique for viewing the social interactions of people.

Newby, J., McCarroll, J., Ursano, R., Fan, Z., Shigemura, J., & Tucker-Harris, Y. (2005). Positive and negative consequences of a military deployment. *Military Medicine , 170*, 815-819.

As the title implies, the article discusses the costs and benefits of a military deployment, specifically to Bosnia. The study concluded that single Soldiers are more likely to see positive consequences of deployment than married Soldiers.

Neylan, T., Lenoci, M., Rothlind, J., Metzler, T., Schuff, N., Du, A.-T., et al. (2004). Attention, learning, and memory in posttraumatic stress disorder. *Journal of Traumatic Stress , 1* (1), 41-46.

A study conducted on combat veterans with PTSD from the Vietnam War. The conclusion reinforced the concept that PTSD does not significantly affect a person's attention, learning, or memory.

Reivich, K., Seligman, M., & McBride, S. (2011). Master Reilience Training in the U.S.Army. *American Psychologist , 66*(1), 25-34.

An in depth look at the U.S. Army's MRT program. It provides information on the Army's current method of increasing resilience within Soldiers.

Ruef, A., & Schlenger, W. (2000). Hispanic ethnicity and risk for combat-related posttraumatic stress disorder. *Cultural Diversity and Ethnic Minority Psychology , 6*, 235-251.

The paper is a study on Hispanic veterans of the Vietnam War. It identifies that there was a higher risk of developing PTSD for Hispanics than there was for any other race/ethnicity during the Vietnam War. This implies that there may be a link between race/ethnicity and the possibility of developing PTSD

Shaw, M., & Hector, M. (2010). Listening to military members returning from Iraq and/or Afghanistan: A phenomenological investigation. *Professional Psychology: Research and Practice , 41* (No. 2), 128-134.

With the sharply increasing numbers of veterans seeing mental health specialists, the authors found it necessary to establish a base of knowledge which psychologists could use to help them relate to these former military members. This knowledge base would be very helpful in the treatment of personality disorders such as PTSD or depression.

Smith, S., & Cook, S. (2004). Are reports of posttraumatic growth positively biased? *Journal of Traumatic Stress , 17* (No. 4), 353-358.

The purpose of this report was to determine if current methods of research positively bias PTG. The experiments findings actually pointed to a slight underestimation of PTG by the current methods.

Van Duijn, M., & Vermunt, J. (2006). What is special about social network analysis? *European Journal of Research Methods for the Behavioral and Social Sciences, 2*(1), 2-6.

The main characteristics and uses of social network analysis as well as an overview of the statistical models for SNA are provided. The authors also provide a look at the social network data that can be collected.

Vlaander, G. P., & Van Rooijen, L. (1985). Independence and conformity in Holland: Asch's experiment three decades later [Electronic version]. *Gedrag: Tijdschrift voor Psychologie, 13*(1), 49-55.

Thirty years later Vlaander and Van Rooijen replicate the classic social conformity experiment of Solomon Asch. They find their results were similar to Asch's, showing no significant difference in the conformity of two generations.

Vogt, D., Samper, R., King, L., & Martin, J. (2008). Deployment stressors and posttraumatic stress symptomatology: comparing active duty and National Guard/Reserve personnel from Gulf War I. *Journal of Traumatic Stress , 21*, 66-74.

A study of PTSD among active duty Soldiers versus National Guard and Reserve Soldiers. The article found that PTSD was higher among National Guard/Reserve Soldiers.

Wasserman, S., & Faust, K. (1994). Social network analysis: methods and applications. San Francisco: Cambridge University Press.

Yehuda, R. (2002). Post-Traumatic Stress Disorder. *The New England Journal of Medicine , Vol. 346* (No. 2), 108-114.

A review of the literature available on PTSD, the article provides a thorough look at the definition, epidemiology, psychology, and biology of PTSD.